a plurality of mirrors disposed within the housing defining an optical cavity;

an optical, dielectric waveguide structure disposed within the optical cavity, the waveguide structure including a plurality of waveguide channels formed therein and configured so as to form a pattern of folded optical waveguide channels intersecting at the ends thereof subtending thereby an oblique angle between adjacent waveguide channels of less than fifteen degrees, the waveguide channels having a substantially rectangular or square cross section for guiding a laser beam therealong;

a plurality of electrodes disposed within the plurality of compartments and positioned along opposite surfaces of the waveguide structure so as to enclose the waveguide channels; wherein at least one electrode is in contact with gas discharge within the waveguide channels; and

a shield disposed between the plurality of compartments for providing electrical or radio frequency isolation of the gas discharge and the plurality of electrodes from one another.--

Amended Claim 2 is set forth below in clean form:

--2. (Amended) The laser as set forth in Claim 1 wherein the shield is a radio frequency shield.--

Amended Claim 3 is set forth below in clean form:

--3. (Amended) The laser as set forth in Claim 1 wherein the shield includes a plurality of fingers extending from the shield.--

Amended Claim 4 is set forth below in clean form:

--4. (Amended) The laser as set forth in Claim 3 wherein the waveguide structure includes a plurality of holes for receiving the fingers extending from the shield.--

Amended Claim 5 is set forth below in clean form:

--5. (Amended) The laser as set forth in Claim 1 wherein the shield is disposed a prescribed distance from the plurality of electrodes for preventing electrical arcing between the shield and the plurality of electrodes.--

Amended Claim 6 is set forth below in clean form:

--6. (Amended) The laser as set forth in Claim 1 wherein the housing includes an opening in a first surface thereof allowing passage of the shield therethrough for maintaining electrical contact between the shield and the housing.--

Amended Claim 7 is set forth below in clean form:

--7. (Amended) The laser as set forth in Claim 1 wherein the substantially rectangular or square cross section includes at least one rounded corner.--

Amended Claim 8 is set forth below in clean form:

--8. The laser as set forth in Claim 1 wherein the waveguide structure is disposed within the optical cavity a prescribed distance from the housing for preventing electrical arcing between the waveguide and the housing.--

Amended Claim 9 is set forth below in clean form:

--9. (Amended) The laser as set forth in Claim 1 further comprising a plurality of flat, spiral inductors distributed along the length of the plurality of electrodes and connected to the plurality of electrodes and to a power supply for tuning out the capacitance of the plurality of electrodes obtaining thereby a uniform voltage along the length of each of the plurality of electrodes and achieving a uniform gas discharge excitation.--

Amended Claim 10 is set forth below in clean form:

--10. (Amended) The laser as set forth in Claim 9 wherein the plurality of spiral inductors are disposed within the housing a prescribed distance from the housing for preventing electrical arcing between the inductors and the housing.--

Amended Claim 16 is set forth below in clean form:

--16. (Amended) The laser as set forth in Claim 9 further comprising a mechanism positioned between the plurality of spiral inductors and the laser housing providing thereby a force retaining the plurality of spiral inductors within the plurality of compartments and an electrical connection between the plurality of spiral inductors and the laser housing.--

Amended Claim 20 is set forth below in clean form:

--20. (Amended) The laser as set forth in Claim 9 further comprising an electrical circuit connected to the power supply and to the plurality of spiral inductors providing thereby phase and impedance matching between the power supply, the plurality

of spiral inductors, the plurality of electrodes and the gas discharge within the waveguide channels.--

Amended Claim 21 is set forth below in clean form:

--21. (Amended) A standing wave laser comprising:

a housing;

a plurality of mirrors disposed within the housing defining an optical cavity;

an optical, dielectric waveguide structure disposed within the optical cavity, the waveguide structure including a plurality of waveguide channels formed therein and configured so as to form a pattern of folded waveguide channels intersecting at the ends thereof subtending thereby an oblique angle between adjacent waveguide channels of less than fifteen degrees, the waveguide channels having a substantially rectangular cross section for guiding a laser beam therealong, the waveguide channel cross section having a prescribed width to height ratio for a prescribed total length of the plurality of waveguide channels; and

a plurality of electrodes positioned along opposite surfaces of the waveguide structure so as to enclose the waveguide channels; wherein at least one electrode is in contact with gas discharge.--

Amended Claim 22 is set forth below in clean form:

--22. (Amended) The laser as set forth in Claim 21 wherein the prescribed width to height ratio of the waveguide channel cross section for a prescribed total length of the plurality of waveguide channels is in relation to a prescribed Fresnel number in the

width direction of the waveguide channels of less than about 0.35 and a prescribed Fresnel number in the height direction of the waveguide channels of less than about 0.20 obtaining thereby good mode quality in the laser output.--

Amended Claim 23 is set forth below in clean form:

--23. (Amended) The laser as set forth in Claim 22 wherein the prescribed Fresnel number in the width direction is defined by the equation:

$$N_{fw} = W^2/4\lambda L_c$$

and the prescribed Fresnel number in the height direction is defined by the equation:

$$N_{fH} = H^2/4\lambda L_c$$

wherein L_c is the total length of the plurality of channels, W is the width of each waveguide channel, H is the height of each waveguide channel and λ is the wavelength of the laser.

Amended Claim 24 is set forth below in clean form:

--24. (Amended) The laser as set forth in Claim 21 wherein the substantially rectangular or square cross section includes at least one rounded corner.--

Amended Claim 25 is set forth below in clean form:

--25. (Amended) A laser comprising:

a housing;

a plurality of mirrors disposed within the housing defining an optical cavity;

an optical, dielectric waveguide structure disposed within the optical cavity, the waveguide structure including a plurality of waveguide channels formed therein and configured so as to form a pattern of folded waveguide channels intersecting at the ends thereof subtending thereby an oblique angle between adjacent waveguide channels of less than fifteen degrees, the waveguide channels having a substantially rectangular cross section for guiding a laser beam therealong;

a plurality of electrodes positioned along opposite surfaces of the waveguide structure so as to enclose the waveguide channels; wherein at least one electrode is in contact with gas discharge; and

an optical assembly mounted to the laser housing, the optical assembly including a plurality of compartments for retaining the plurality of laser beam turning mechanisms, which laser beam turning mechanisms are adjustable in angular position with respect to the laser beam or the plurality of waveguide channels, each of the plurality of compartments extending a corresponding distance from the laser housing whereby the plurality of compartments are accessible for adjusting the plurality of laser beam turning mechanisms.--

Amended Claim 28 is set forth below in clean form:

--28. (Amended) The laser as set forth in Claim 25 wherein the optical assembly includes:

a post;

a receptacle in the post for receiving the laser beam turning mechanisms therein;

a compression ring mounted on the post for applying a force radially towards the laser beam turning mechanisms thereby retaining the laser beam turning mechanisms in the receptacle;

a flexure mechanism connected to the post and to the optical housing; and

an adjustment mechanism engaging the post at a plurality of points for providing alignment of the laser beam turning mechanisms relative to the plurality of waveguide channels.--

Amended Claim 29 is set forth below in clean form:

--29. (Amended) The laser as set forth in Claim 25 wherein the substantially rectangular or square cross section includes at least one rounded corner.--

Amended Claim 30 is set forth below in clean form:

--30. (Amended) The laser as set forth in Claim 1 further comprising:

a periscope housing affixed to the laser housing for receiving the laser beam emitted from one of the plurality of channels of the waveguide structure and redirecting the laser beam;

wherein the periscope housing includes first and second mirrors receptive of the laser beam and each mounted at an angle of about 45 degrees relative to a longitudinal axis of the plurality of channels, the first mirror being disposed at an angle of about 90 degrees relative to the second mirror; and

a cylindrical lens receptive of the laser beam from the periscope housing for converting the divergence angle of the laser beam along a horizontal axis of the waveguide channels to match the divergence angle of the laser beam along a vertical axis of the waveguide channels thereby converting an elliptical laser beam into a circular laser beam.--

Amended Claim 35 is set forth below in clean form:

--35. (Amended) The laser as set forth in Claim 1 wherein

a first electrode of the plurality of electrodes is positioned along a first surface of the waveguide structure and connected to a power supply; and

a second electrode of the plurality of electrodes is positioned along a second surface of the waveguide structure in contact with a gas discharge in the waveguide channels and connected to the laser housing.--

Amended Claim 36 is set forth below in clean form:

--36. (Amended) The laser as set forth in Claim 35 wherein the first electrode comprises aluminum and the waveguide structure comprises ceramic.--

New Claim 39 is set forth below:

--39. (New) The laser as set forth in Claim 30 further comprising a two lens telescope positioned relative to the waveguide structure for changing the shape of the laser beam.--

REMARKS

Disposition of the Claims

Claims 1 – 38 are pending in the application. Claims 1 – 38 stand rejected in the application.

Claim Rejections – 35 USC § 103

Claims 1 – 16, 21, 24 – 29, 33, 34 and 35 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Erichsen et al. (U.S. 5,600,668) in view of Cantoni (U.S. 4,815,094).

The Examiner asserts that Erichsen et al teaches:

> "a waveguide laser with a plurality of rectangular channels defined between electrodes 2 and 4. Electrodes 2 and 4 are divided into three pairs of electrodes via grooves 6, resulting in a pairing of sections 22 and 42, 24 and 44 and 26 and 46. Reference numeral teaches at least one power